National Institute of Environmental Health Sciences

Climate change impact assessment of food- and waterborne diseases

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Abstract:

The PubMed and ScienceDirect bibliographic databases were searched for the period of 1998-2009 to evaluate the impact of climatic and environmental determinants on food- and waterborne diseases. The authors assessed 1,642 short and concise sentences (key facts), which were extracted from 722 relevant articles and stored in a climate change knowledge base. Key facts pertaining to temperature, precipitation, water, and food for 6 selected pathogens were scrutinized, evaluated, and compiled according to exposure pathways. These key facts (corresponding to approximately 50,000 words) were mapped to 275 terminology terms identified in the literature, which generated 6,341 connections. These relationships were plotted on semantic network maps to examine the interconnections between variables. The risk of campylobacteriosis is associated with mean weekly temperatures, although this link is shown more strongly in the literature relating to salmonellosis. Irregular and severe rain events are associated with Cryptosporidium sp. outbreaks, while noncholera Vibrio sp. displays increased growth rates in coastal waters during hot summers. In contrast, for Norovirus and Listeria sp. the association with climatic variables was relatively weak, but much stronger for food determinants. Electronic data mining to assess the impact of climate change on food- and waterborne diseases assured a methodical appraisal of the field. This climate change knowledge base can support national climate change vulnerability, impact, and adaptation assessments and facilitate the management of future threats from infectious diseases. In the light of diminishing resources for public health this approach can help balance different climate change adaptation options.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Food/Water Quality, Food/Water Quality

Food/Water Quality: Pathogen, Pathogen

Geographic Feature:

resource focuses on specific type of geography

Freshwater

Geographic Location: ☑

resource focuses on specific location

Global or Unspecified

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Foodborne/Waterborne Disease

Foodborne/Waterborne Disease: Campylobacteriosis, Cryptosporidiosis, General Foodborne/Waterborne Disease, Listeriosis, Norovirus, Salmonellosis, Vibrioses

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Resource Type: ☑

format or standard characteristic of resource

Review

Timescale: ☑

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content